

Seeking esthetics with implants and immediate loading associated with connective tissue graft

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Abstract / Introduction: the use of osseointegrated implants in oral rehabilitation has been extensively studied, with clinical success being proved when these devices are associated with appropriate technique, immersion time and oral hygiene. Immediate loading is defined as when an implant is subjected to occlusal load within 24 hours after the surgical procedure. Bone quality, minimally traumatic surgical technique, primary stability, appropriate occlusal load distribution on implant long axis are key factors to long-term success of the immediate loading protocol. **Objective:** to report the case of a 42-year-old male patient who presented for treatment reporting pain. Clinical examination revealed crown fracture in mesiodistal direction and extending towards the root. **Methods:** considering favorable periapical radiographic findings, treatment option was for tooth extraction and immediate placement of a TPS surface-treated 5.0 x 13.0 mm screw-tapered implant (Replace Select, Steri-Oss). Prior and during surgery, a thin buccal gingiva was observed. Thus, it was decided to remove a connective tissue graft from the palate and place it below the buccal periost. **Results:** after three months of osseointegration, excellent bone and gingival response could be observed with satisfactory esthetics. **Conclusion:** immediate osseointegrated implant placement reduced treatment time and the number of surgical stages. Appropriate pre-surgical examination rendered the choice of a suitable implant easier, thus improving primary stability that is vital to osseointegration success.

Keywords: Dental implants. Osseointegration. Dental esthetics.

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» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

INTRODUCTION

The use of osseointegrated implants in oral rehabilitation has been extensively studied, with clinical success being proved by findings by Brånemark et al.^{1,3} and Albrektsson et al.² These authors established the basic requirements for osseointegration in an implant placement protocol consisting of two surgical stages. These stages comprise a period between 3 and 6 months of implant immersion in order to guarantee osseointegration. This period must be combined with plaque control and proper occlusion.^{4,5}

Osseointegration can be defined as the direct contact of bone with a biocompatible implant. The long-term success achieved by the traditional protocol motivated more detailed research of which goal was to decrease treatment time and provide patients with cost-benefit advantages, including the following: decreased healing period; exemption from using temporary partial dentures, thereby improving patient's esthetic and psychological conditions; and elimination of the second surgical stage.⁶⁻¹²

This case report aimed to present the use of an immediate-loaded implant associated with connective tissue graft in order to provide patient with better esthetics.

LITERATURE REVIEW AND DISCUSSION

In view of the need to reduce treatment time and provide patients with better cost-benefit advantages, several authors

have suggested new protocols which led to the use of immediate-loaded implants. The first studies emerged in 1979, with Ledermann's research. The initial concept of immediate loading was defined as an implant subjected to occlusal load within 24 hours after surgery.^{12,13} During the International Congress of Oral Implantologists (ICOI), in 2006, the concept was modified by a consensus, suggesting that occlusal load should be conducted within 48 hours after implant placement.^{11,14,15}

According to several authors,^{11,16,17} the success of immediate-loaded implants relies on careful patient selection. Patients must present adequate bone quality and quantity. In addition, skeletal discrepancy between upper and lower jaws should not be present. Finally, proper bone healing is also paramount and the patient needs to maintain good oral hygiene. Thus, this protocol is not indicated for patients who have received high radiation doses and those who present psychiatric problems, systemic blood disorders, chronic diseases, alcohol abuse, illicit or licit drugs consumption, tobacco chewers or heavy smokers, since these factors affect one's general health and healing.

Considering the guidelines to perform this procedure, bone quality and quantity have the most influence on immediate loading protocols. According to Misch and Wang,¹⁸ implant placement in compact bone without fenestration or dehiscence will most likely guarantee better

initial stability and support immediate occlusal loading. In general, bone quality is characterized by a thick and dense cortical layer. This allows primary stability for fixation, which controls the micromovements involved in implant loss.^{15,19} Studies report that only 3% of implants placed in bone type I, II and III failed, whereas bone type IV presented a failure rate of 35%.²⁰ These studies, combined with findings by Davies,²¹ suggest that bone quality and quantity are the key to select and conduct immediate implant loading.

With better bone density, better stability can be obtained, which is an important clinical factor that influences immediate loading success, since the transmission of micromovements to the implant body can induce severe bone crest loss and reduced osseointegration. This results in the formation of a fibrous capsule at the bone-implant interface.^{22,23,24} Neugebauer et al²⁵ showed that an insertion torque greater than 35 N/cm² promotes increased bone-implant contact, which also boosts the probability of implant success. These studies agree that proper primary stability is essential for immediate loading.¹²

Other factors related to immediate loading are the macro and micrometric structures present on the implant surface. The cylindrical screw shape improves primary stability and provides an adequate bonding surface for the osteoblasts, thus enabling better osseointegration.²⁶

Immediate implant loading surgery follows the same guidelines as traditional

implant placement does. The surgeon should ensure that the heat generated during bone drilling does not exceed 47 °C, thus preventing bone necrosis. Such trauma can be minimized by proper irrigation and sharp burs.^{27,28}

Bone quality, macroscale shape, micrometric surface structure, minimally traumatic surgical technique, primary stability, three-dimensional placement of implants, and appropriate occlusal load distribution along implant long axis are key factors to long-term immediate loading protocol success.^{6,11,13}

CASE REPORT

A 42-year-old male patient presented for treatment with indication of extraction of a maxillary right second premolar (Fig 1). An alginate impression was taken in order to have an acrylic provisional crown manufactured prior to extraction.

Periapical radiographs were obtained to evaluate root size, shape and position, the amount of bone available between adjacent teeth roots as well as between the alveolar ridge and the maxillary sinus base floor, so as to finally determine the most suitable implant size (Fig 2). Potential pathological processes were also revealed on the site and adjacent areas.

Considering patient's favorable data, it was decided to perform immediate dental implant loading, respecting the

principles of good initial stability and immediate prosthesis placement.

Surgery was performed under local anesthesia. An intrasulcular incision was made using a scalpel blade 15C in order to preserve the gingival papillae. With the aid of a periotome and a straight elevator, the tooth was carefully extracted, avoiding damage to the alveolar bone. Subsequently,

periodontal fibers were removed by curettage. A round bur under copious irrigation was used in order to perforate the apical cortex, and a 2-mm diameter drill was used up to 13 mm deep, as previously determined by radiographic examination. Radiographic images were obtained during surgery to ensure correct implant position. The procedure was complete by increasing the diameter of the drills up to the prede-



Figure 1. Preoperative clinical photograph.

terminated implant size. With the aid of a ratchet wrench and without using a thread former, a TPS surface-treated, 5.0 x 13.0 mm screw-tapered implant (Replace Select, Steri-Oss) was placed, filling the entire socket. After placing the abutment in correct position, a temporary acrylic crown was adapted.

Prior and during surgery, a very thin buccal gingiva was observed. Concerned about losing gingiva quality and quantity (volume and height), it was decided to obtain connective tissue graft from the palatal area (Fig 3) that was carefully placed below the buccal periost (about 2 mm occlusally from adjacent

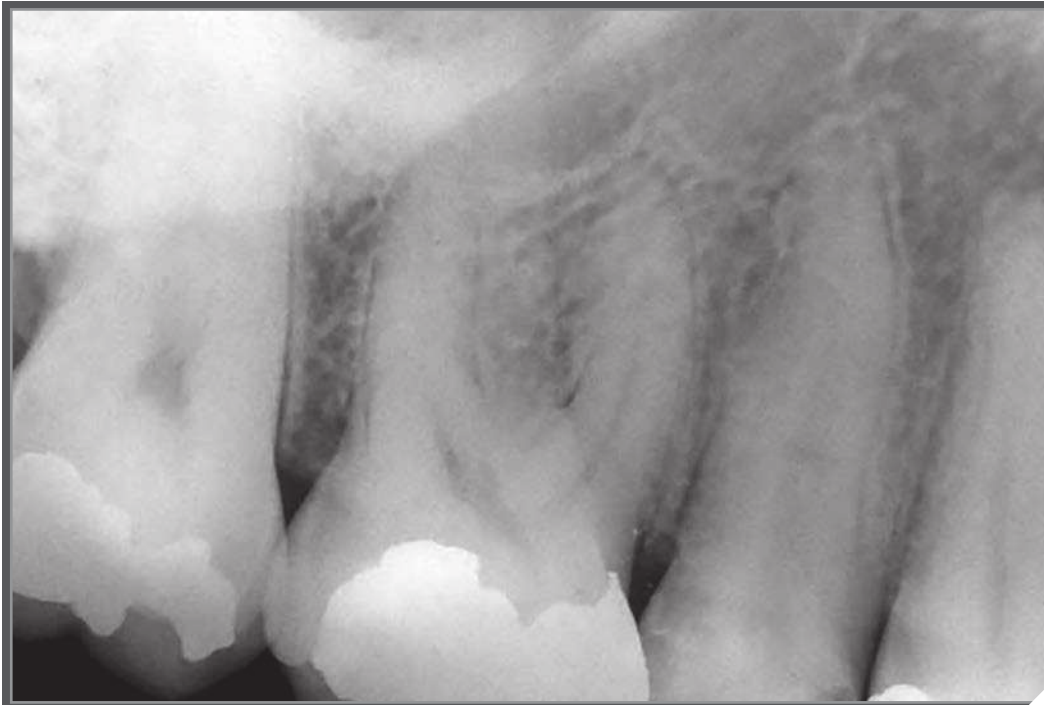


Figure 2. Preoperative radiograph.

teeth) and stabilized by sutures in the gingiva itself. Occlusal adjustments of the temporary crown were performed in order to avoid contacts on maximal habitual intercuspation and eccentric excursions of the lower jaw, to keep implant stability. The temporary crown

was also adjusted at buccal, lingual and proximal surfaces in order to guide soft tissue healing (Fig 4). The graft suture was removed after ten days, thereby providing shorter treatment time and a satisfactory esthetic result for the patient (Figs 5, 6, 7).



Figure 3. Connective tissue graft harvested from the palate.



Figure 4. Positioned crown and graft stabilized by suture.



Figure 5. Clinical aspect three months after of implant placement. **Figure 6.** Radiograph immediately after surgery. **Figure 7.** Radiograph after three months showing bone neoformation filling the cervical portion of the alveolus.

CONCLUSION

Based on the outcomes of the case presented herein, it can be concluded that:

- 1) Immediate implant loading reduced treatment time, which increased patient's self-esteem and well-being, since the use of removable temporary prosthesis was rendered unnecessary.
- 2) Appropriate preoperative examination rendered the choice of implant easier,

thus improving primary stability that is vital to osseointegration success.

- 3) Occlusal adjustments of the crown, in centric relation and eccentric movements, ensured predictable outcomes.
- 4) Thorough clinical and esthetic evaluation, in addition to knowledge on connective tissue graft technique aided the final esthetic outcomes.

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